CLAIMS:

1. A radio-frequent (RF) coil system for use in a magnetic resonance imaging (MRI) system, comprising at least one electrical main coil for transmitting an RF magnetic field into an examination volume of the MRI system and/or receiving an RF magnetic field from the examination volume, said main coil having a main coil axis which is to be oriented substantially parallel to a main magnetic field of the MRI system in the examination volume, said main coil having at least one electrical conductor extending mainly parallel to the main coil axis, characterized in that the RF coil system comprises at least two electrical auxiliary coils assigned to said conductor of the main coil and arranged on opposite sides of said conductor of the main coil, each auxiliary coil having a coil axis extending substantially parallel to the main coil axis at a distance from said conductor of the main coil, wherein said distance is small relative to a main dimension of the main coil.

2. An RF coil system as claimed in claim 1, characterized in that the main coil has a loop comprising a first and a second electrical conductor extending mainly parallel to the main coil axis, the RF coil system having a first and a second auxiliary coil assigned to said first conductor and arranged on opposite sides of said first conductor and a third and a fourth auxiliary coil assigned to said second conductor and arranged on opposite sides of said second conductor, each auxiliary coil having a coil axis extending substantially parallel to the main coil axis at a distance from the respective conductor of the main coil to which the respective auxiliary coil is assigned, wherein said distance is small relative to said main dimension.

3. An RF coil system as claimed in claim 1, characterized in that the two auxiliary coils are connected in series in an electrical anti-phase mode.

4. An RF coil system as claimed in claim 1, characterized in that the conductor of the main coil extends substantially parallel to the main coil axis, and each auxiliary coil comprises two conductors extending substantially parallel to the main coil axis, wherein the distance between the coil axis of each auxiliary coil and the conductor of the main coil is

larger than 0,5*B and smaller than 1,5*B, B being a distance between the two conductors of the respective auxiliary coil.

5. An RF coil system as claimed in claim 2, characterized in that the first and the second conductor of the main coil extend substantially parallel to the main coil axis, and each auxiliary coil comprises two conductors extending substantially parallel to the main coil axis, wherein a distance B between the two conductors of each auxiliary coil is larger than 0,06*L and smaller than 0,25*L, L being a distance between the first and the second conductor of the main coil.

6. An RF coil system as claimed in claim 2, characterized in that the RF coil system comprises a skin contact surface, the first and the second conductor of the main coil extending in an imaginary plane at a distance D from said skin contact surface, and each auxiliary coil extending in an imaginary plane at a distance H from said skin contact surface, wherein $0 < H < 3*D$.

7. An RF coil system as claimed in claim 6, characterized in that $D < H < 1,5*D$.

8. A magnetic resonance imaging (MRI) system comprising an examination volume, a main magnet system for generating a main magnetic field in the examination volume, a gradient magnet system for generating gradients of the main magnetic field, and an RF coil system for transmitting an RF magnetic field into the examination volume and/or receiving an RF magnetic field from the examination volume, characterized in that the RF coil system is an RF coil system as claimed in anyone of the preceding claims.